

REMARKS/ARGUMENTS

Applicant responds herein to the non-final Office Action mailed May 24, 2011 in the above-identified patent application.

Claims 1, 3, 5 and 7-15 are the claims currently presented for examination in the present application.

Rejection of Claims 1, 3, 5 and 7 under 35 U.S.C. § 102

Claims 1, 3, 5 and 7 are rejected under 35 U.S.C. § 102 as being anticipated by Horio et al., JP 2003-037302. Reconsideration of this rejection is respectfully requested.

The following discussion of an aspect of Applicant's invention as claimed in claims 1 and 3 is provided to illustrate by way of example features of the invention but in no way limits the scope of the claims. Claims 1 and 3 are directed to a thermoelectric semiconductor material that is produced according to a series of steps recited in the claims so as to obtain improved thermoelectric performance for a thermoelectric module.

Claim 1 requires a thermoelectric semiconductor material produced by layering and packing plate shaped raw thermoelectric semiconductor materials made of a raw alloy to form a layered body, and solidifying and forming the layered body to form a compact body, wherein the raw alloy and molten form is contacted with a surface of the cooling member so as to form the plate shaped raw thermoelectric semiconductor materials having a thickness of at least 70 μm recited in claims 1 and 3.

Horio discloses the formation of what is translated as a rectangular parallelepiped body. The Office Action cites paragraphs 29-35, 48 and Figs. 7-9 of Horio and alleges that this corresponds to plate-shaped raw thermoelectric semiconductor material having a thickness of at least 70 μm .

The Office Action evidences a number of errors in understanding of the Horio Japanese patent document. The Examiner appears to have reviewed an English-language machine translation of the original Japanese specification of Horio, which caused misunderstandings of the precise parameters of the teachings of Horio. The following analysis was prepared by native Japanese-language readers who reviewed the original Horio reference.

First, Horio does not disclose or suggest forming plate-shaped raw thermoelectric semiconductor materials having a thickness of at least 70 μm , as required by claims 1 and 3. Horio is silent as such a thickness for the semiconductor products produced.

In addition, Horio does not disclose or suggest a plate-shaped raw thermoelectric

semiconductor materials, as further required by claims 1 and 3.

Horio discloses a rectangular parallelepiped part of a solidified and formed body having a rectangular parallelepiped shaped that is obtained by cutting the solidified and formed body into half, and then using this for a sheath rolling, as described at step S7c of Fig. 1 and Fig. 10 of Horio. Paragraph 48 of Horio discloses that in sheath rolling, the solidification plastic body was cut in half and the form was made into rectangular parallelepiped shape, the lengths of the sides of which were 50 mm on one side and 25 mm on the other side.

In addition, Horio teaches that a flake is formed by a melt-quenching method, that is by a liquid quenching method or a rolling, as illustrated in step S4 of Fig. 1 and Fig. 3 of Horio. Horio discloses a plurality of flakes that are layered so that a laminate is formed, and that the above-described solidified and formed body is made of the laminate by performing a hot pressing. Paragraph 48 of Horio describes that when it states that in working example number 14 through 19, a flake or powder is produced with a melt-quenching method from ingot prepared to each presentation, and that the solidification plastic solid was produced by performing 400 and annealing treatment of 10 hours in Ar atmosphere, laminating the foil after that, and performing a hot press by making the thickness direction, that is the direction parallel to c-side, of the foil into the pressing direction.

Accordingly, Horio does not disclose or suggest a plate-shaped raw thermoelectric semiconductor material, as required by claim 1.

The Office Action alleges that the parallelepiped shape material of Horio has a thickness of greater than 70 μm even after the 20% reduction of thickness after the rolling discussed by Horio. However, since the material for the rectangular piped material before the rolling is performed is a liquid, it is impossible to understand the meaning of a 20% reduction of a thickness after the rolling (that is the melt-quenching method). However, even if the Office Action correctly understands the content of Horio with respect to the parallelepiped shaped analysis as discussed above, the thickness of the flake, which the Office Action compares to the plate-shaped raw thermoelectric semiconductor materials, cannot be identified based on the dimension of the solidification plastic solid (to solidify the formed body) disclosed by Horio. Accordingly, Horio does not disclose or suggest the recitations of claims 1 and 3.

Claims 5 and 7 depend from claim 3, and are therefore patentably distinguishable over the cited art for at least the same reasons.

Rejection of Claims 8-15 under 35 U.S.C. § 103

Claims 8-15 are rejected under 35 U.S.C. § 103 as being obvious from Fukada et al., U.S. Patent No. 6,274,802 in view of Horio et al. Reconsideration of this rejection is respectfully requested.

Claim 8 requires a thermoelectric semiconductor element produced by layering and packing plate-shaped raw thermoelectric semiconductor materials to form a layered body, and solidifying and forming the layered body to form a compact body, wherein the raw alloy in molten form is contacted with a surface of a cooling member so as to form the plate-shaped raw thermoelectric semiconductor materials having a thickness of at least 70 µm.

Claim 12 requires a thermoelectric semiconductor module comprising a PN element pair produced by layering and packing respectively plate-shaped raw semiconductor materials made of a raw alloy, and solidifying and forming the layered bodies to form compact bodies, wherein the raw alloy in molten form is contacted with a surface of the cooling member so as to form the plate-shaped raw thermoelectric semiconductor materials having a thickness of at least 70 µm.

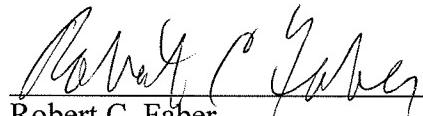
Fukada does not cure the above-discussed deficiencies of Horio as they relate to the above-cited features of claims 8 and 12. Further, the Office Action does not allege that Fukada discloses or suggests such features. Even taken together in combination, Horio and Fukada do not disclose or suggest the recitations of claims 8 and 12.

Claims 9-11 depend from claim 8 and claims 13-15 depend from claim 12. Therefore, claims 9-11 and 13-15 are therefore patentably distinguishable over the cited art for at least the same reasons as their respective base claim.

In view of the foregoing discussion, withdrawal of the rejections and allowance of the claims of the present application are respectfully requested.

Respectfully submitted,

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